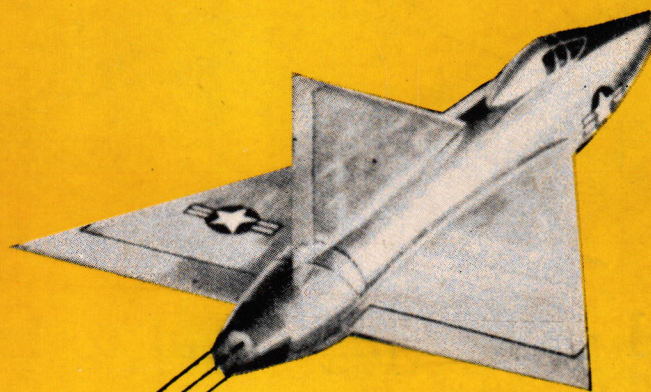


vol 12 no 1

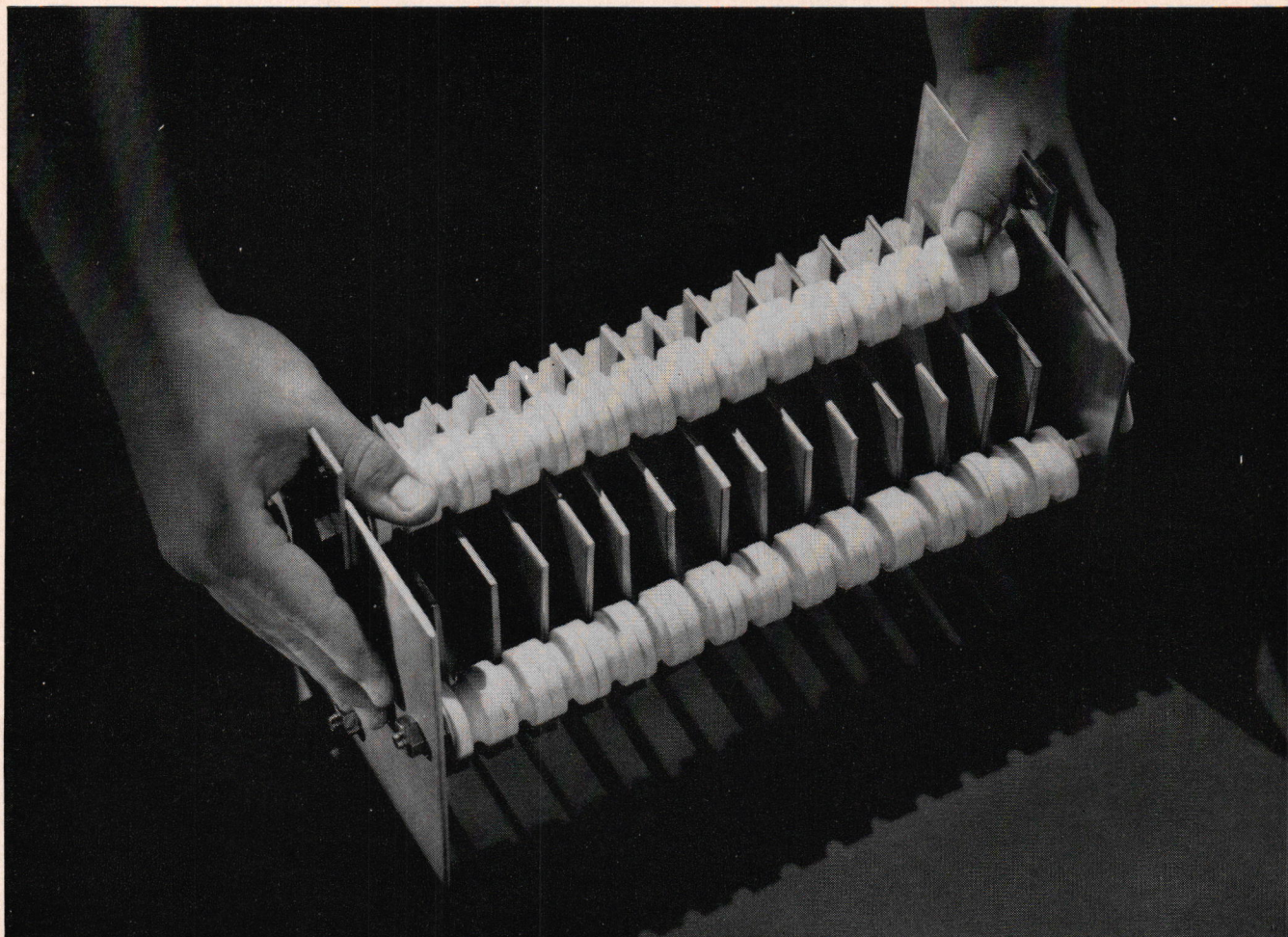
^{the} Mecheleciv



OCTOBER 1952



**THE SCHOOL OF ENGINEERING
GEORGE WASHINGTON UNIVERSITY**



Steel guinea pig about to have a breakdown

● We've come a long way toward licking the No. 1 enemy of steel—*corrosion*.

At United States Steel, for example, we've learned a lot through exposure tests, equipment service trials, accelerated laboratory tests, and the like. But there's just one way to be sure which grade of steel will give the longest service per dollar of cost on any given job: *try it under actual operating conditions*.

That's where the steel "guinea pigs" come in. Those expendable corrosion test racks are made up from a dozen or more different grades of steel separated by porcelain insulators that prevent galvanic action. We actually put the "guinea pigs" right into the operating equipment that contains corrosive liquids or gases. Then, when the steel specimens have been exposed to the service conditions for predetermined periods of time, we remove the guinea pigs, send them to the laboratory and determine the

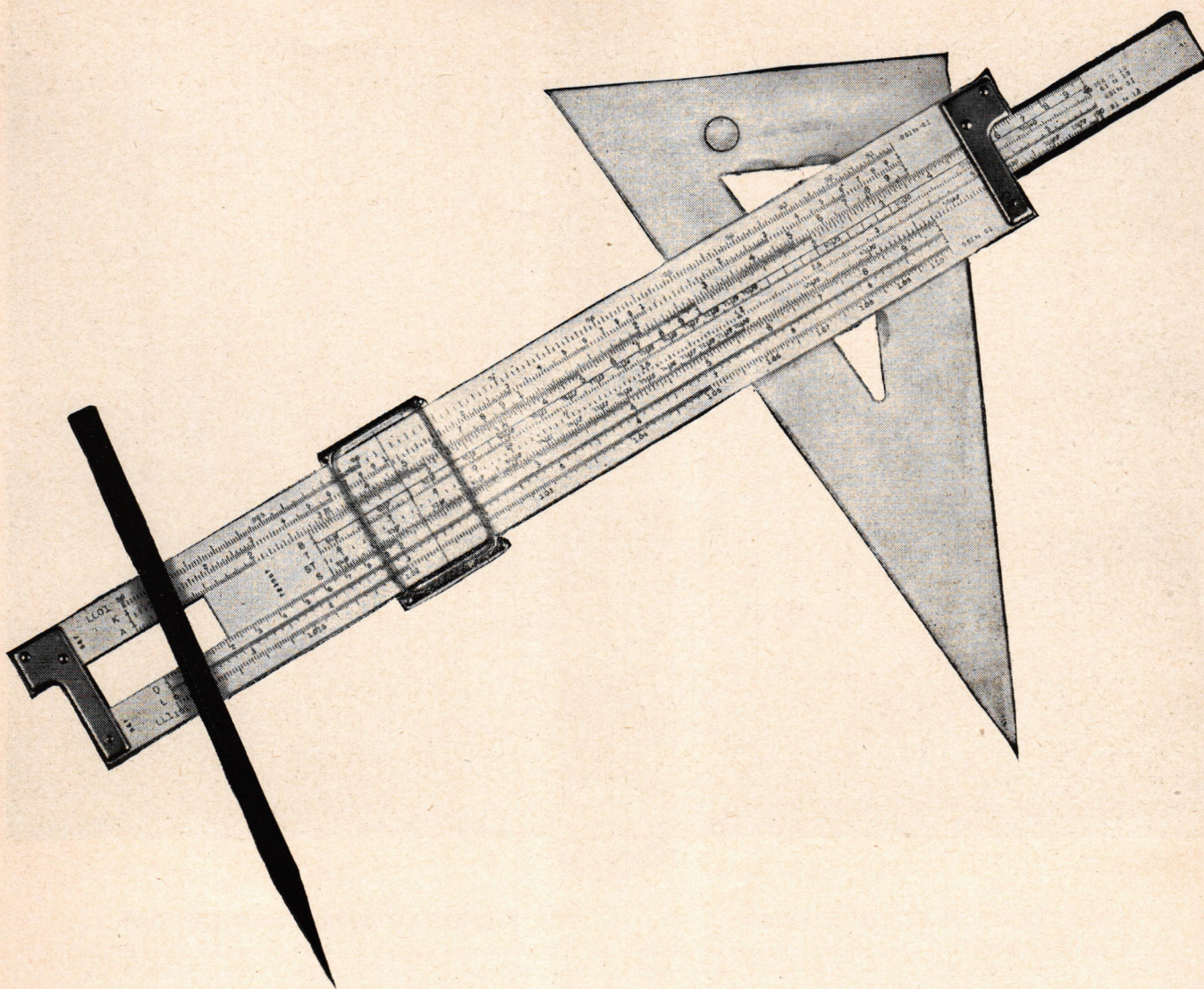
most economical steel for that particular service. To our way of thinking, this is the most accurate way to decide what grade of steel is the best buy for a particular installation.

Actual on-the-job corrosion tests like these have saved many thousands of dollars for refineries, textile and paper mills, food processing plants and other manufacturers to whom corrosion is an expensive headache. For these users, the cost of steel replacement has been lowered; and our customers have had fewer hours of lost production time due to corrosive failure.

This guinea pig test is typical of the many and varied research projects sponsored by United States Steel. Trained metallurgists in the field and in dozens of research laboratories are working to develop new steel compositions, and to solve problems involving the more efficient use of steel. United States Steel Company, 525 William Penn Place, Pittsburgh 30, Pa.



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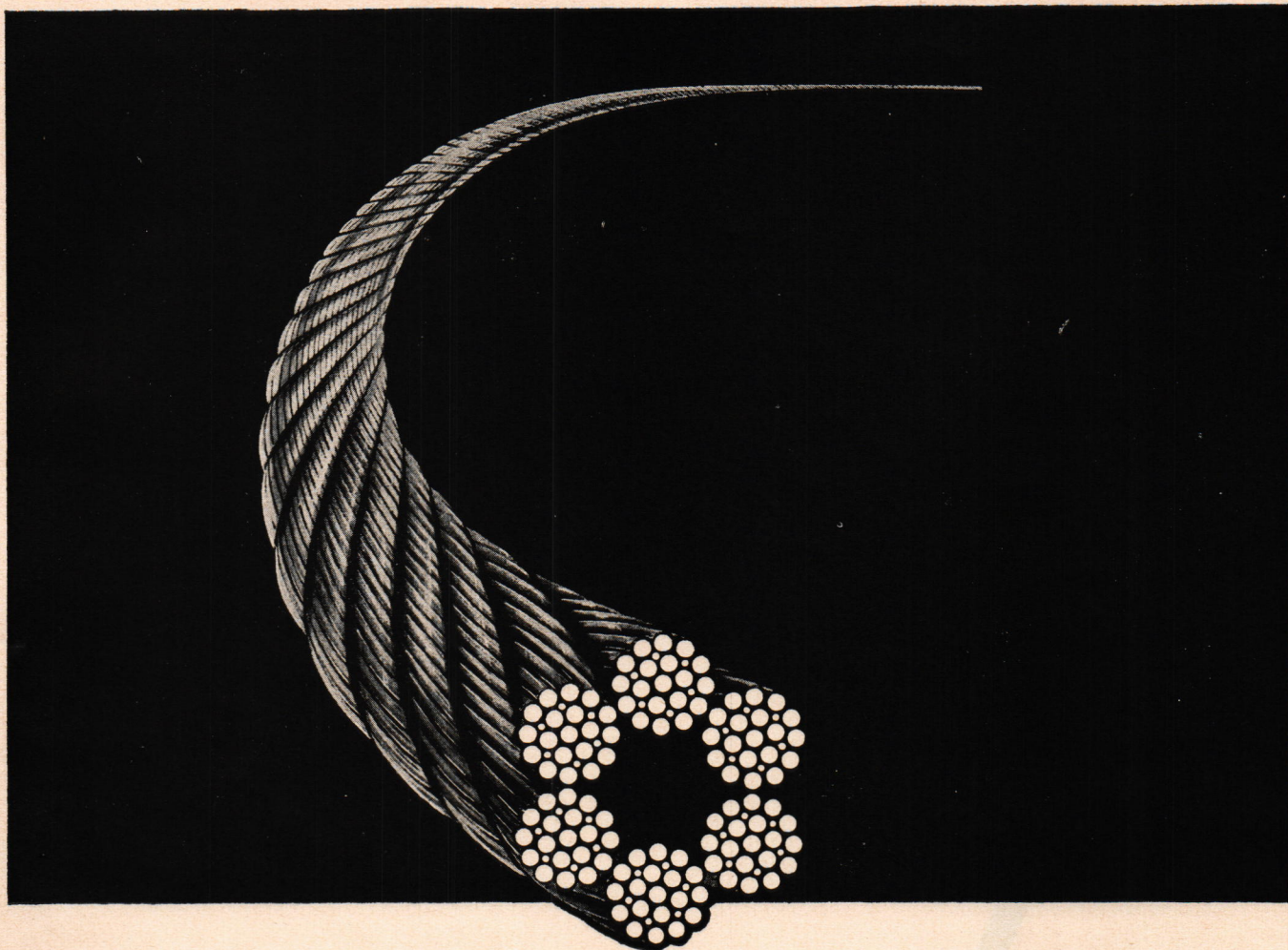
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BOEING



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A one-foot length of this six-strand, steel-sinewed piece of wire rope has 150 or more feet of wire. And each wire in this precision product must be accurate within a thousandth of an inch.

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HEADQUARTERS FOR BUSINESS INFORMATION



THE MECHELECIV

Mecheleciv



VOL. 12

OCTOBER 1952

NO. 1

ON THE COVER . . .

The Air Forces' new XF-92A equipped with afterburner, shown in flight, made its initial flight on September 18, 1948 and was later delivered to N.A.C.A. This powerful jet was built by the Consolidated Vultee Aircraft Corp. as an experimental ship to explore and test flight characteristics of a true delta wing.

FRONTISPIECE . . .

Not the walls of Jericho—just the rugged remains of the west portion of Building D. The wall was left standing after all the floors were removed from the end of the building which is being remodeled into library facilities. When finished, the building will house the Carnegie collection recently donated to the university. It is rumored that the collection contains 60,000 volumes. Completion of the new addition will provide the George Washington University with one of the finest library facilities in the country.

Mofoto

ENGINEERING SCHOOL CALENDER

- October 18—Theta Tau Initiation, 1:30, Studio "A", Lisner Auditorium. Banquet and Dance, YMCA, 3d Floor, 6:30
- October 22—Engineers Council, Conference Room, Bldg. "M"
- November 5—Society Meetings. Monroe Hall and Hall of Government. Directory first Floor, Govt.
- November 8—Theta Tau Alum Stag Party. Cameron Club, Alexandria. 8:00
- November 12—Theta Tau. Conference Room, Student Union Annex. 8:00

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Can Do . . .

When World War II broke out and involved the United States it soon became evident that a tremendous construction program was required to support the efforts of the fighting forces. Ordinary measures wouldn't do. Miracles had to be performed, extraordinary and difficult tasks had to be accomplished immediately, and the impossible ones were required on short order. Men in the engineering professions and construction trades rallied to meet the challenge and their accomplishments exceeded all expectations. "Miracle Men" they were called—they were known as Sea Bees.

The students in the School of Engineering, by their choice of profession, are potentially of the same fiber. By saying this, it is not to be construed that all engineers are supermen, but the deeds of the Sea Bees stand as proof that engineers CAN be supermen. However, super beings do not develop from those who are content to do only what is expected and no more. He who desires to do better than an average job, who is interested in improving the lot of others as well as himself and who takes interest in the affairs around him, thereby broadening his knowledge and experience—he has the potentialities that permit development into a super-being.

Here on the campus, the things we want, the things we need, and things that benefit us, are the things we must work for. Not only must we work until we get them, but after we get them, to improve on them—making them better and better, thereby improving our position and welfare, while ability and self-confidence is being developed to an ever-increasing degree.

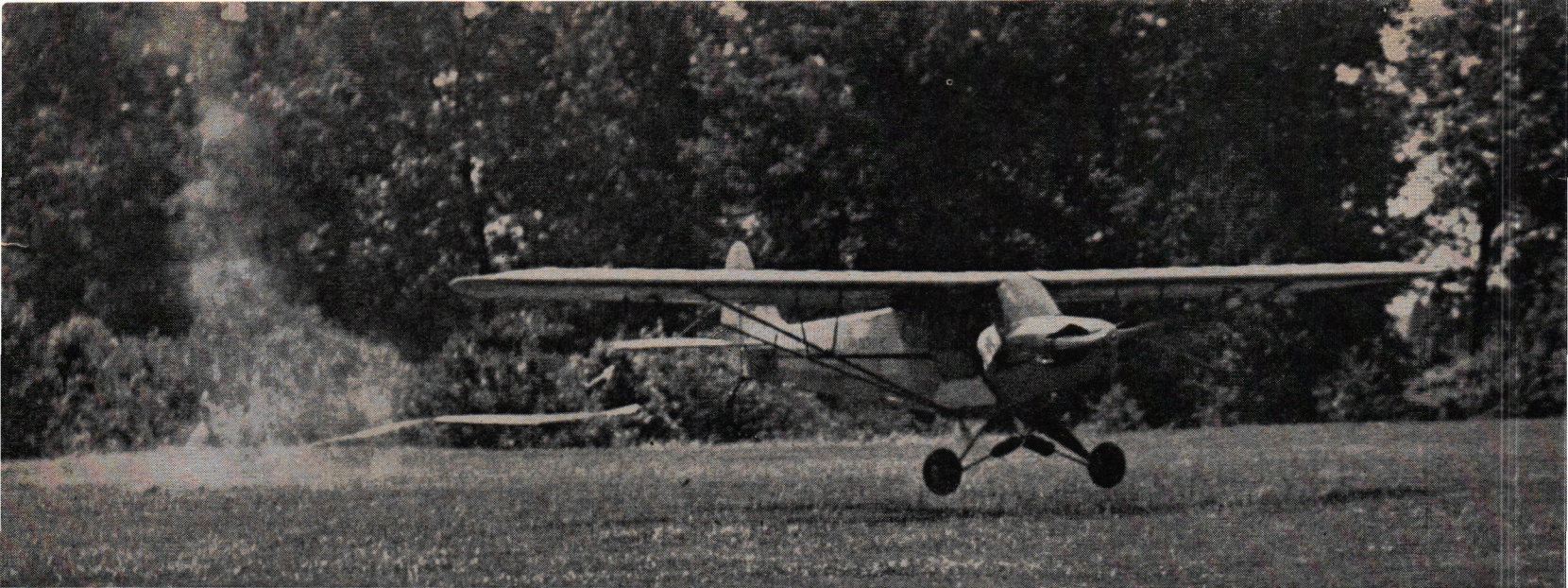
Where must we start? The Mecheleciv, for instance, a staff composed of Freshmen, Sophomores, Junior and Seniors—men who can grow with the magazine and who in turn can assure continuing improvement and perfection of a publication that has developed, over a short span of years, into a professional engineering journal comparing favorably with the best publications of its kind in the country.

The engineering societies need support. Lower classmen who join early become dynamic leaders in their senior years by gaining ability, knowledge and a professional attitude. The leadership qualities that are developed become recognized by the professional fraternities on the campus and active engineers are invited to membership.

Extra curricular participation stimulates ability, develops confidence and prepares the engineering student for the tough job ahead of being a good, successful, engineer, one who "Can Do" anything the profession demands.

Don't forget, the Sea Bees were ENGINEERS and CONSTRUCTION MEN. Their motto was "Can Do." You are also going to be engineers. Tradition has been established. Will you be willing to try to match the feats of those who set the pace before you?

You can get your start on the campus. CAN DO?



All American Airways

Stopping 'Em with NYLON

G. Gould

Undergraduate in Mechanical Engineering

This is an account of one peculiar property of material known as "undrawn" or "unoriented" nylon.

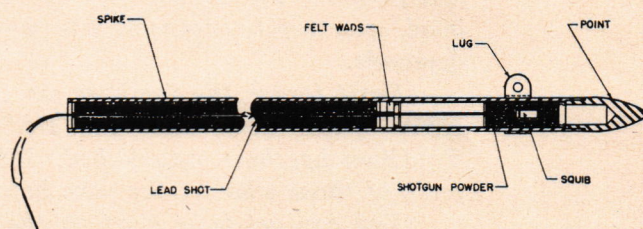
The duPont Company first produced and marketed nylon fiber. Richard duPont founded All American Aviation, Inc., in 1939, to develop and promote the use of air pick-up for local air mail service. In the course of research it was discovered that raw, undrawn nylon had unusual energy absorbing properties and the use of this undrawn nylon, later called Unolyn¹ by All American, was a determining factor in the success of this system.

In the production of nylon fiber, an amorphous mass of the plastic polymer is extruded through tiny openings to create the filaments. In this condition, the molecules in the filament are arranged in random structure. A subsequent stretching, or "drawing" process is required to reposition the molecules in their long-chain structure so as to make the filament usable in its normal applications. In the "drawing" process the filament is elongated as much as three to four hundred percent, and, once the drawing is complete, the filament again possesses normal resiliency, elongation and tensile strength. It is the fact that the orienting process is accomplished under constant load which is most interesting and useful. In review, the unoriented filament is subjected to load

and, up to a finite limit, strain is proportional to stress; at a slight additional load an elongation of three to four hundred percent occurs with **no** load increase, and under further loading the strain-stress proportionality is resumed to a point approaching the ultimate strength.

It is this peculiarity of nylon which most interested the engineers, for here they observed a great capacity for doing useful work. How to make use of that terrific elongation became a fascinating project.

At the end of several months of application engineering and experimentation with coatings and treatments to protect the "undrawn" nylon from the ultra-violet rays of the sun and from abrasive damage, and to make the nylon draw consistently at low temperatures, the first demon-

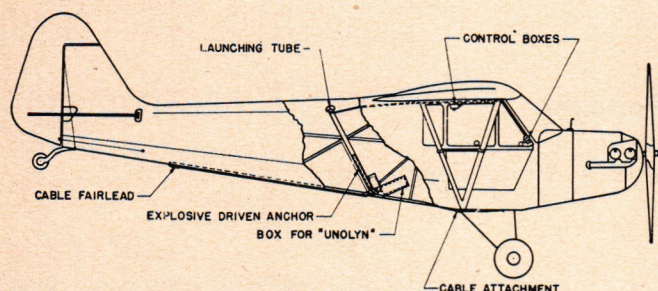


● Cutaway of spike used as arrester. Cable and Unolyn tape are attached to lug.

strations of the practicability of the new material as an energy absorber occurred. A pipe-like ejection tube was mounted in the after fuselage sec-

¹ UNOLYN is the trade-name used by All American Aviation, Inc. of Wilmington, Delaware for undrawn synthetic plastic fibers.

tion of a light airplane, and in the tube was stowed a long steel spike. Above the spike in the tube was placed a powder charge and a ballast of lead shot. A 40 ft. belt of woven "unoriented" nylon was secured to the spike by a steel leader, reefed into a container on the under side of the

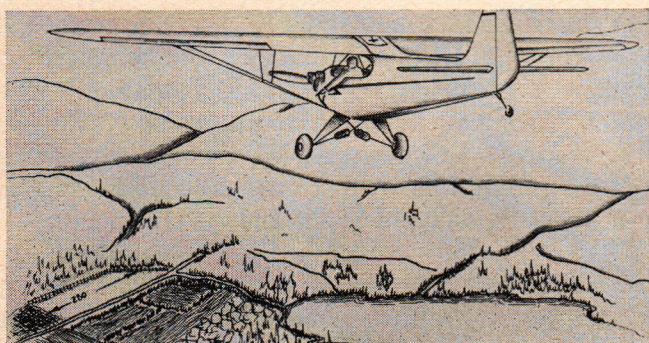


● Diagrammatic drawing of arrestor gear installation as used on a Piper Cub.

airplane and thence made fast to the undercarriage.

Landing of the airplane was attempted in a field far too small for any normal dead-stick landing. As the plane neared the ground the powder charge was fired projecting the spike deep into the adjacent earth and the shot ballast into the air, thereby eliminating any reaction load on the airplane. Due to the forward velocity of the aircraft, approximately 70 miles per hr. the nylon belt was pulled from the airplane and upon becoming taut reached the critical draw load and extended well over three times its original length. The kinetic energy of the moving aircraft was rapidly dissipated by the forces incident to repositioning the molecules in the nylon belt. In a few seconds the energy of the airplane was completely spent and it stopped in mid air, then pancaked to the ground—all in a distance of about 100 ft. The obvious result was that what might have been a serious crash under actual emergency landing conditions was nothing more than a 1.25 G landing with absolutely no damage to pilot or plane.

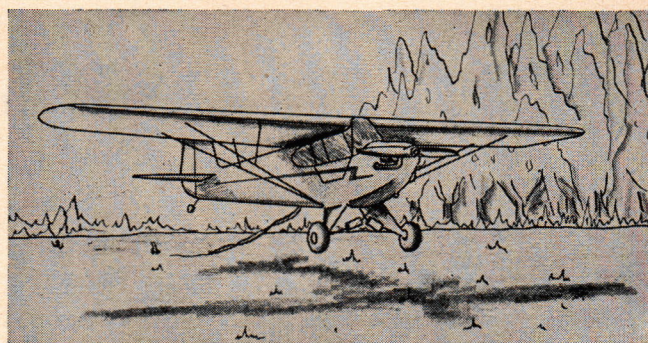
Energy absorbing belts of this nature have since been used in glider target recovery, air launching of towed equipment and for snatching loads from the ground with moving aircraft.



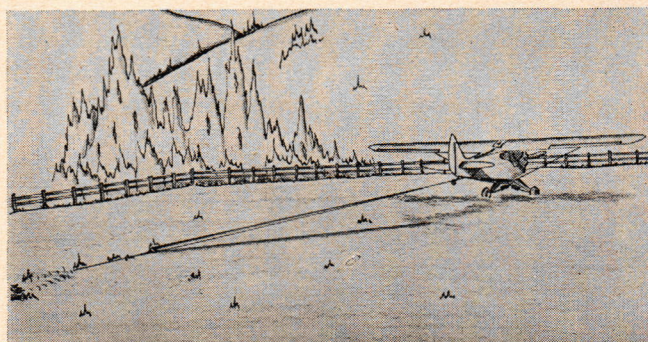
Trouble—

All illustrations courtesy All American Airways, Inc.

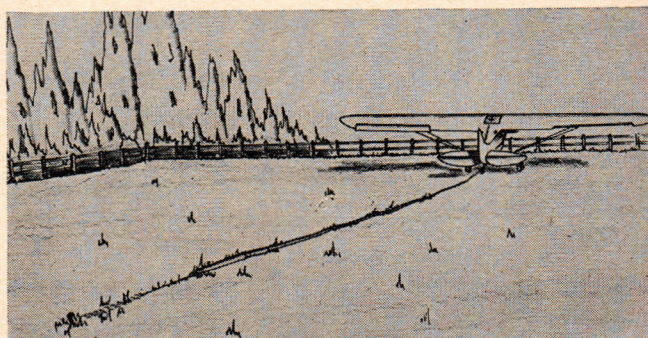
All of these uses have been experimental only, no regular commercial or military use of "undrawn" nylon is presently known to the writer. The further application of this neat, "energy absorbing" package remains as a challenge to the ingenuity of today's development engineers.



Shoot the Spike—



Stretch and—



Stop

Background information: When Richard duPont founded All American Airways, a small engineering department was organized and the necessary mechanical devices to enable aircraft in flight to pick up mail were developed and tested.

The successful development of this equipment lead to the institution of scheduled air mail service using air pick-up. The company then split into two divisions: the Air Transport Division, which operated the scheduled air line, and the Engineering Division, which continued development work.

The advent of World War II in 1941 resulted in the application of air pick-up to gliders as well as cargo, and during the war period air pick-up systems capable of handling gliders weighing up

Please turn to page 30

Automatic Process Control

Donald L. Rodenhi

Undergraduate in Electrical Engineering

Automatic control embraces a wide range of functions and processes. Probably the most commonly known form is that of a thermostatically controlled home heating plant. However, whether it is this simple application or temperature control of a 10,000 HP diesel engine that is considered, the same fundamentals are the governing factors.

Comparison with manual control will show one reason why automatic control has become increasingly important. Manual control is subject to errors due to operator fatigue or negligence. Automatic control makes it possible for one operator to supervise several processes simultaneously and to produce a more uniform product than would otherwise be possible. Also, because of the close and definite limits within which the process variable can be controlled, considerable savings in fuel and raw material can be achieved. In general the use of automatic control is justified by increased efficiency and economy.

The first question to be answered in setting up an automatic control system is which variable should be controlled. The logical answer to this is that it should be the one which can be most conveniently measured. Usually the regulation of such a variable is not an end in itself but is the most practical method of controlling a selected variable whose direct measurement and control would be very awkward or impossible. An example of this is in the heat treatment of steel where the temperature is the controlled variable while the physical property of the steel is the variable over which regulation is desired. From this it is evident that the measured variable must bear a constant and known relationship to the controlled variable.

Every process exhibits two familiar effects which are the prime factors influencing the selection of control equipment. These are (1) change

in the controlled variable due to altered conditions in the process, usually called load changes, and (2) a delay in the time required for the changes to cause the variable to assume a new value.

Process load is the total requirement by the process for the control agent which is the means used to restore the variable to its desired value. Load changes are often not easily recognized. A change in any of the variables associated with energy or material balance constitutes a load change. In the case of a fluid being heated in a heat exchanger load changes may be caused by any one of the following causes:

- (1) Variations in the flow rate or temperature of the fluid being heated;
- (2) Changes in the quality of the control agent, for instance in the heating value of the fuel or the pressure of the steam;
- (3) Uncontrolled variations in flow of the control agent;
- (4) Changes in ambient conditions, such as varying radiation losses;
- (5) Variable quantity of heat generated by chemical action.

The capacitance of a process is defined as the change in quantity of energy or material per unit change in some reference variable: for example, if 200 BTU are required to raise the temperature of the controlled medium 10F, the capacitance is $200/10$ or 20 BTU per degree F. In any operation where the capacitance is large compared to the flow of control agent the conditions are favorable to control. However, where the capacitance is in the supply side of the control agent the variable is likely to oscillate about the control point.

Depending on the locations of the sensing elements and control elements there will be more or less time delay between the measurement of a change and the corrective action.

The mode of control is the manner in which the controlling means responds to a change in the measured variable. Common modes are two-position, proportional, proportional-reset, and proportional or proportional-reset plus rate ration.

Two-position control consists of a system in which the control mechanism assumes one or two positions. These may be either on-or-off or just high-and-low. The response of this type of control is oscillating through relatively wide limits about the operating point.

Proportional control requires that the flow of control agent be proportional to the deviation from the control point. When used with a well damped system this control method will give very steady control.

Proportional control with automatic reset compensates for semi-permanent changes in the load values. The reset action has the effect of moving the proportional band which is limited to approximately 20% on either side of the set point.

In order to obtain faster and consequently closer control the control agent must act as soon as possible following a change in load. If a proportional control action is used which responds to the first derivative of the deviation control action will be much faster.

From the foregoing it is evident that process control can be made as close as desirable; however, the attendant costs increase with increasing accuracy. Therefore the control system should be no more elaborate than is actually required.

The main elements of an automatically controlled system are the process and the automatic controller. The process may be defined as the collective functions performed in and by the equipment in which a variable is controlled. The automatic controller is defined as a mechanism which measures the value of the variable quantity or condition and operates to correct or limit deviation of this measured value from a selected reference.

SPECIFYING HAZARDOUS DUTY FANS

R. G. Lubinsky

*Manager, Fan and Blast Coil Department
The Trane Co.*

Because, up until now, there have been no proper standards for conveniently specifying spark-proof fans, an engineer could not explain to the manufacturer exactly what he wanted without going into lengthy details.

Now, however, he has a guide. The National Association of Fan Manufacturers has recently adopted standards covering fans for hazardous duty. Fans for this service are no longer referred to as being sparkproof. They are spark-resistant. The following is quoted from the adopted standards of NAFM:

SPARK-RESISTANT FANS

Construction

Type

- A All parts of the fan in contact with the air or gas being handled shall be made of non-ferrous material.
- B The fan shall have an entirely non-ferrous wheel and a non-ferrous ring about the opening through which the shaft passes.
- C The fan shall be so constructed that a shift of the wheel or shaft will not permit two ferrous parts of the fan to rub or strike.
Note: Bearings shall not be placed in the air or gas stream. The user shall electrically ground all fan parts.

With these three standards, it will now be a simple matter for an engineer to specify what he wants. He will merely indicate the type desired, and if he is concerned about materials, he will indicate the type of nonferrous material he wants. If he specifies Type C, the engineer also may want to specify what parts of the fan are to be non-ferrous.

Trane Weather Magic

ENGINEERS CLUB A REALITY . . . Yes! We finally got it. The good news came out at the Engineer's Mixer October 4th. This culminates a two year effort to obtain a place that George Washington's Engineers could call home. Before anyone can feel at home in our new center, however, much work will have to be done. Hint: The faster we get volunteer helpers to paint, repair and fix the place up the earlier we can move in. At this moment Carpenters, Plasterers and Painters are in demand. If you can't furnish muscle donations of paint, lumber, wire and fixtures are in order. Anyone who can do something, or donate shall leave his name and phone number in the Dean's office. LETS GO!

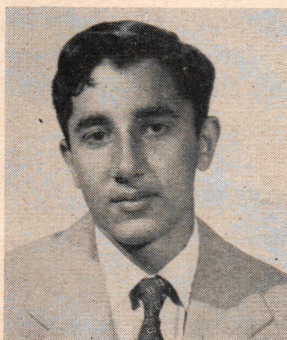
NEWS AND VIEWS

SCHOLARSHIPS

This year, for the first time, The George Washington University's School of Engineering offered four scholarships. The scholarships have been established by The Board of Trustees of the University to be offered annually to deserving high school seniors. These scholarships cover full first year tuition.

The four trustee scholars selected for the academic year 1952-53 are:

James A. Cauffman, 17, of 504 Independence Ave., S.E. James is a graduate of Eastern High School and has been employed by the U.S.A.F. Chart Service this past summer. He will embark on a program of studies leading to the degree of Bachelor of Science in Engineering.



Gope D. Hingorani, 16, of 5613 30th Street N.W. Gope is the son of the Educational attache of the Indian Embassy here in Washington. A graduate of Woodrow Wilson High School, Gope attended Philips Academy, Andover, Mass. on scholarship this summer. He will attend classes this coming year leading to

the degree of Bachelor of Science in Engineering.

Jeffery H. Rumbaugh, 17, of 215 Whittier St., N.W. Jeffery is a graduate of Calvin Coolidge High School and will pursue a course at the University leading to the degree of Bachelor of Electrical Engineering.

Warren A. Russell, 18, of 2409 53rd Ave., S.E. Warren, a graduate of Suitland High School, has been employed this past summer by the Chesapeake and Potomac Telephone Company. He will work towards the degree of Bachelor of Electrical Engineering.

NEW COURSES

Two new courses were established in the School of Engineering this semester.

ME 147, Industrial Labor Relations, has been added to the Mechanical Engineering curriculum. This course is planned particularly for those with some training on management. It embodies a study of the relationship between labor and management, with a view to obtaining the optimum cooperation between the two elements in order to get more effective production. It will also deal with the history of labor relations, terms of modern methods of collective bargaining and current legislation concerning labor relations.

The course will be taught by Mr. Ray Colbert, Director of the Navy Industrial Training Program and graduate of Arizona State College. Mr. Colbert plans to have other experts in the field address the class as guest lecturers.

Students may be admitted by permission of the instructor. Classes will be held Tuesdays and Thursdays at 7:00 P.M.

EE 129, Symmetrical Components, has been added to the Power Option of the Electrical Engineering curriculum. This course deals with the theory and application of symmetrical components in unbalanced circuits, alternating current machinery and transmission lines. It replaces EE 125-6, Principles of Electric Power Transmission in the EE Curriculum.

Classes will be held Monday, Wednesday and Friday at 6:00 P.M.

DEPARTED PROF

Jerome Antel, who was Assistant Professor of Electrical Engineering at George Washington University for the past four years, has accepted a position as Electrical Engineer with The Naval Ordnance Laboratory. All he can tell us about his new position is that he is in the Ammunition Division.

We all wish you good luck on your new job, Mr. Antel.

G. W. HOMECOMING

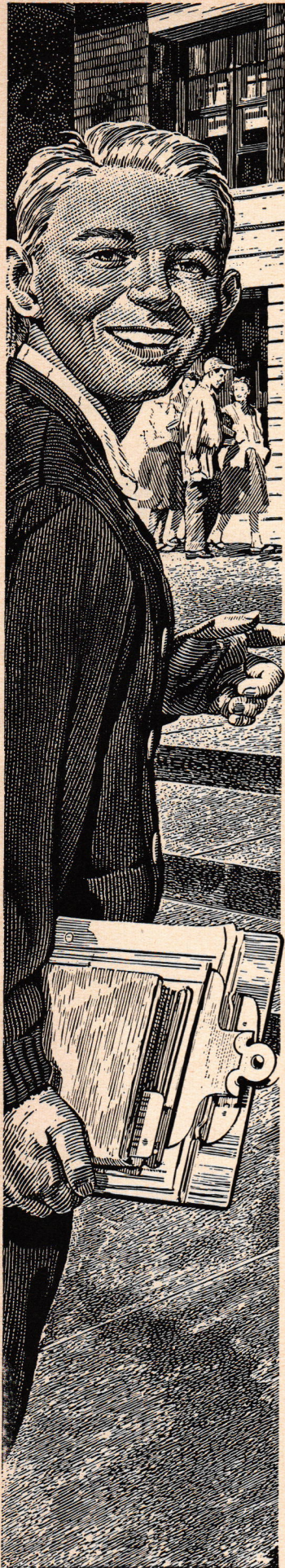
As you well know, the annual George Washington University Homecoming is approaching. Success of this event depends upon all of us; group cooperation in the Queen contest and the Dance are much needed. However, a fine opportunity to have your organization work as a group and gain recognition for their efforts is by entering the float contest at the Homecoming football game.

This year, on Friday night, October 24, our Colonials play Virginia Military Institute whose team is called the Kaydets. Give your group a while to think up a slogan for your float and then get busy. There will be several prizes, but the number of prizes is dependent upon the number of entries, will be announced at a later date in the Hatchet. The three requisites of the judging will be: (1) originality of slogan; (2) originality of presentation; (3) workmanship. Naturally no slogan can be duplicated, so the sooner a slogan is received, the sooner confirmation can be made to enable one to proceed with his float.

The construction of the float has several restrictions imposed. Primarily, all floats must be designed to be carried by hand if the field is wet. Otherwise they may be carried on, in, or behind a car (or a small trailer). The float may not be over 80 inches wide at the widest point (this is approximately 6 inches wider than the normal automobile). When mounted on the trailer or automobile, it may not be over 14 feet tall. No flame or electric wiring will be permitted. Soundness of construction will be left to the group making the float, but remember that it must cross the entire field in one piece. In conclusion, no group is to spend more than \$30.00 on their float, and a statement of expenses must be submitted to the Parade Chairman on the afternoon of the parade in the Student Union Annex Mailbox.

Homecoming Parade Chairman

Please turn to page 28



"Willie wants to be President!"

"Of our Student Council, that is.

"That's him over there, passing out his campaign handbills like an alderman passing out cigars.

"Our school elections used to be pretty dull. You know, a couple of funny posters put up in the halls, and that was about it.

"But our new Civics teacher, Mr. Leszczynski, has a theory that we'll learn a heck of a lot more about government and Americanism if we have less reading and more *doing*.

"He started out last year by making two school Parties . . . conventions, platforms and all that. And, while we had a lot of fun with our elections, we learned a lot about government at the same time. We've even got a regular Congress . . . with teachers in our Senate and us pupils in our House of Representatives. All elected by us, too.

"One of the things Mr. Leszczynski keeps drumming into us is the Bill of Rights of the Constitution. He's pretty hot on the subject of our Freedoms . . . religion, press, speech and the rest. He practically *begs* us to appreciate those Freedoms *every* day of our lives, not just on the Fourth of July and on Thanksgiving Day.

"He's not so dumb, either. He must've figured we'd sort of take our lessons home and pass them along to our families. 'Cause since he came to our school, our Parent-Teacher's meetings have been standing-room-only.

"And last regular Election Day in town, more'n 80% of our parents voted. I know both of mine did . . . and so did my big brothers and sisters.

"The funny part about it is . . . Mr. Leszczynski *wasn't even born an American!* But he never misses a chance to vote or take an active part in civic affairs. And he keeps reminding us he had to come to *this* country to find out what Freedom really means.

"To show you what us kids think about him . . . he's the *only* teacher we don't have a nickname for behind his back."

REPUBLIC STEEL

Republic Building • Cleveland 1, Ohio



Republic BECAME strong in a strong and free America. Republic can REMAIN strong only in an America that remains strong and free . . . an America whose people enjoy the many fine products of a modern Beverage Industry. *And, through the Beverage Industry, Republic serves America.* Many, many tons of its carbon, alloy, and, especially, stainless steels are formed into vats, tanks, mixers, bottling machines, vending machines, cans, shipping containers and dispensing equipment. Steel equipment like this makes it possible for Americans to enjoy their favorite tasty and refreshing beverages the year 'round.

* * *

For a full color reprint of this advertisement, write Dept. H, Republic Steel, Cleveland 1, Ohio.



SOCIETIES AND FRATERNITIES

and

Extra Curricular

Activities

● Welcome to the School of Engineering. We are very glad to have you with us this year and hope that we will see you often at our many affairs throughout the coming semesters. Whether you are a freshman or a perpetual senior, now, at the beginning of the school year, is the time for you to join your respective society in order that you do not miss out on any of their varied and interesting meetings and social functions. Once you have joined don't be a wall flower who only attends meetings occasionally and offers nothing for the good of the organization. It is your society—take an active interest in it. If you don't approve of the types of meetings, social affairs, or general business proceedings let others know it. These societies exist for you—for your professional growth as engineers and as good, active citizens. The most successful engineers, like any other successful professional men, are ones who can talk and get along with people in addition to performing the technical side of their work; usually men who through their years of professional activities outside of their jobs alone have made numerous friends and contacts.

We do not mean to deemphasize good scholastic work; it is very important. But it is just as important to develop the ability to talk and write effectively, to meet and work with others and to gain experience in allied fields of endeavor. Participation in extracurricular activities is a great step in this direction. It is considered by many who have taken an active part in the extracurricular activities of the Engineering School that the experience gained is like money in the bank. As engineers begin to take more important positions in the administrative endeavors of American business it is evident that any knowledge and ability along these lines is valuable.

There are three basic things that any student can do for himself now: (1) Read this, the first issue of our magazine, *MECHELECIV*, and familiarize himself with the activities of the Engineering School (the first issue of *MECHELECIV* contains a listing of all officers of all engineering societies, fraternities, and governing bodies in order that you may know who to contact for further information; (2) Attend the Mixers, meet your fellow students, the faculty, and the alumni of the Engineering School, and have yourself some fun in the bargain; (3) Join your professional society and take an active part in the meetings and social functions.

Our professional engineering fraternity, Theta Tau, recognizes in large part the service which the student has rendered in campus activities. Even our honorary fraternity, Sigma Tau, strongly considers sociability as well as scholastic standing in its qualifications for membership.

NOW is the time to participate in YOUR school activities.

C A L E N D A R

October 1, 1952—Annual Engineers' Mixer, Highland Apts. Restaurant, Conn. Ave. & California St., N.W. 8:30 P.M. Admission was FREE.

December 15, 1952—Christmas Tree Lighting Ceremony sponsored by the Engineers' Council.

February 23, 1953—Annual Engineers' Ball. Time and place to be announced later.

May 2, 1953—Annual Engineers' Banquet Award presentation ceremonies. Time and place to be announced later.



● The George Washington University Branch of the AIEE presents the students with an opportunity to participate in a professional society and to become acquainted with other engineering associates who are either studying or practicing their profession.

The Branch was established at the University in 1932, and active membership is open to all students enrolled in electrical engineering. Meetings are held on the first Wednesday of every month during the Fall and Winter semesters. Noted authorities on electrical engineering and related subjects are the principal speakers at the meetings. At various times during the school year, field trips to nearby electrical installations are sponsored by the AIEE.

A high spot in the school calendar is the annual Section Branch Dinner meeting held in the spring. Here the undergraduate has the opportunity to meet and discuss engineering topics with men who are established in the electrical engineering field. Another event that arouses a high interest among the student electrical engineers is the annual prize paper competition. This contest gives the student an opportunity to present a paper on some engineering subject in the Washington Section of the AIEE and the winner has his expenses paid to a later competition between students of other schools in this AIEE district.

Membership in a technical society is an essential part of the young engineer's education. It affords him the chance to acquaint himself with the opportunities and responsibilities of the engineering profession. He learns to cooperate with his fellow engineers. Here also is the opportunity for self-expression limited only by the student's ambition and capabilities. The George Washington University Branch of the American Institute of Electrical Engineers fills this need for the Electrical Engineering student.



Who is it takes a transit out to find a sewer to tap?

Who then with extreme care locates the junction on the map?

Who is it goes to dig it up and finds it nowhere near?

The mud bespattered, torn and tattered CIVIL ENGINEER!

Please turn to page 18

Easy way to get rich

SUPPOSE, as you enter a grocery store, you suddenly find the denomination of every bill in your pocket has doubled! You're rich! Until you find that the same "magic" has doubled the price of everything in the store.

That's the sort of "prosperity" America has been "enjoying."

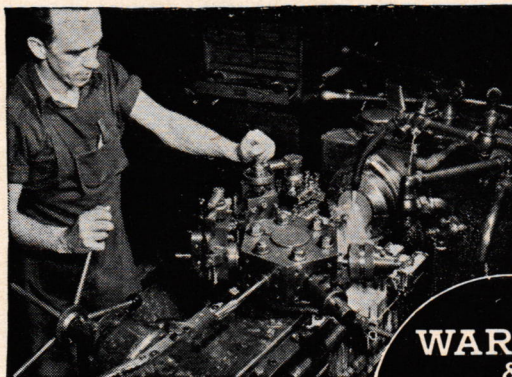
Most Americans feel they're worth more today than a few years ago; actually their savings have been whittled away 23% in the 7 years since the

war. *More money without more goods* always bids prices up and up to the sky.

If you like what's been happening to you, if you think this is prosperity, let's make a *good* job of it; let's make every bill a *million* dollar bill—or a *billion*, as Germany did. If inflated money makes everybody happy, let's be hysterical!

But Germany didn't find it much fun, the morning after.

Source: "How to Keep Our Liberty" by Raymond Moley.
Published by Knopf, 1952

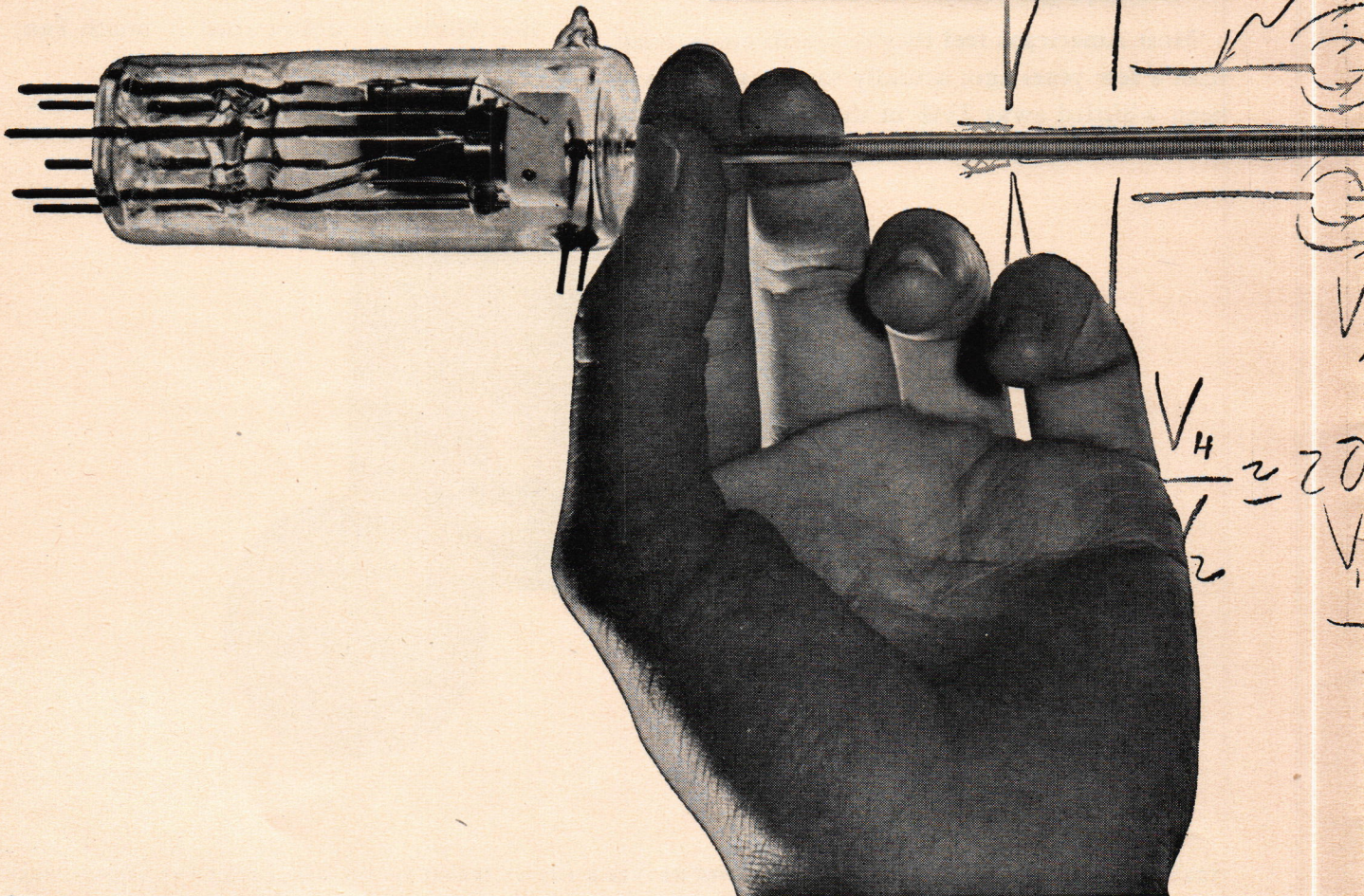
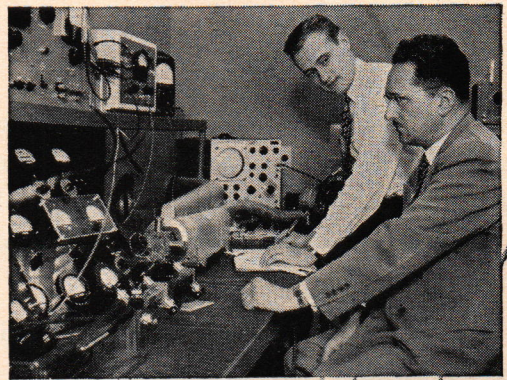


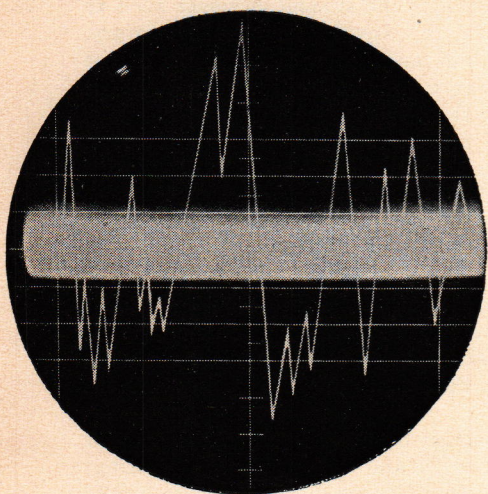
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Machine Tools
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YOU CAN MACHINE IT BETTER, FASTER, FOR LESS WITH WARNER & SWASEY TURRET LATHES, AUTOMATICS AND TAPPING MACHINES

Reducing noise in radar...

Measuring the noise figure of an experimental traveling-wave tube are Dr. A. V. Haeff (right) head of the Electron Tube Laboratories at Hughes, and Dr. Dean Watkins (left) one of his co-workers.

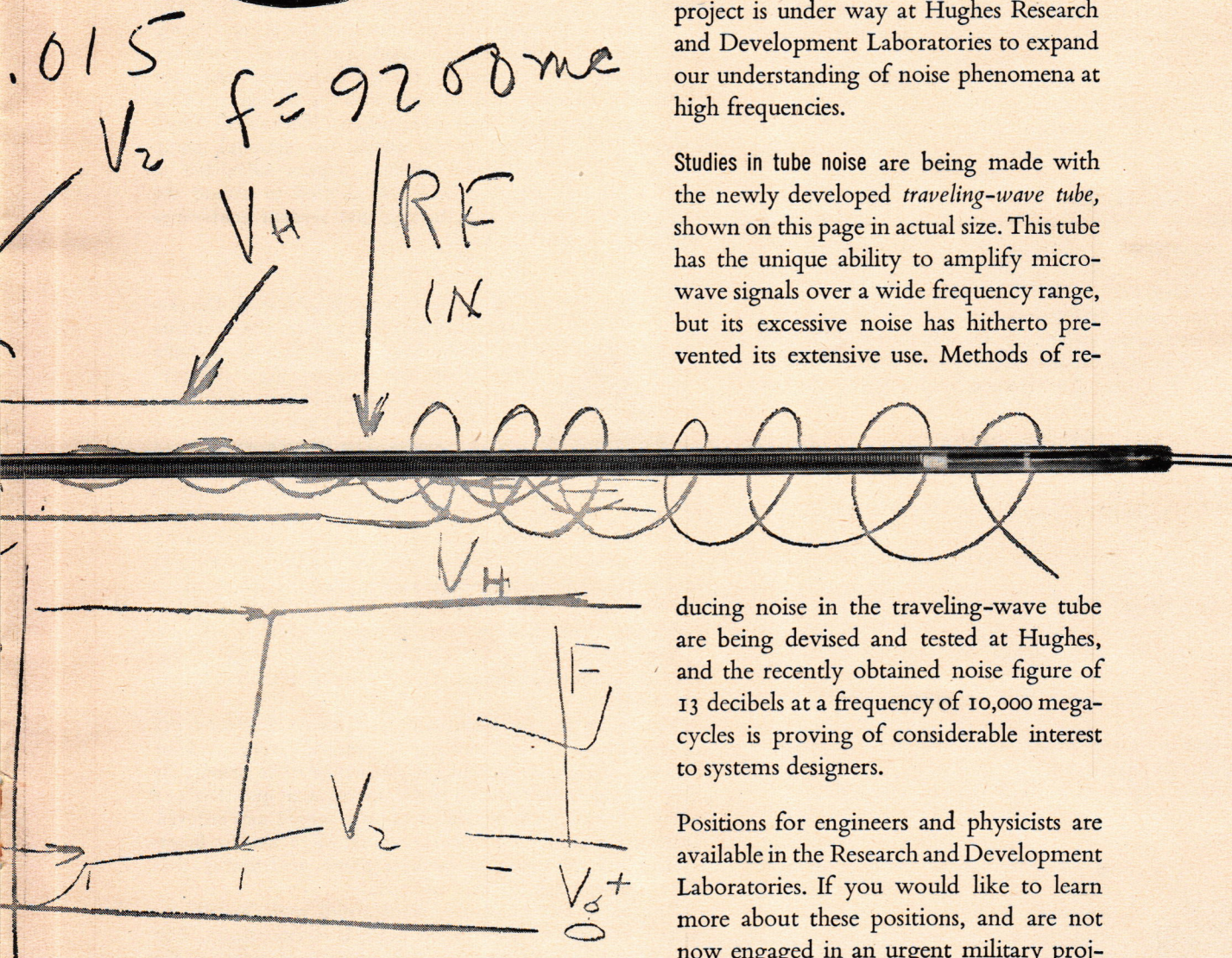




In the operation of a radar system, the amount of energy reflected from small targets is very minute. The over-all sensitivity and range of radar depend equally upon effectively generating and transmitting considerable power at microwave frequencies—and upon effectively receiving and amplifying very weak echo signals.

An important limitation in receiver sensitivity is imposed by noise that is created within the receiving tubes—and caused by random motion of electrons. Because the reduction of tube noise could make available improved techniques to the designer of many types of microwave systems, a project is under way at Hughes Research and Development Laboratories to expand our understanding of noise phenomena at high frequencies.

Studies in tube noise are being made with the newly developed *traveling-wave tube*, shown on this page in actual size. This tube has the unique ability to amplify microwave signals over a wide frequency range, but its excessive noise has hitherto prevented its extensive use. Methods of re-



ducing noise in the traveling-wave tube are being devised and tested at Hughes, and the recently obtained noise figure of 13 decibels at a frequency of 10,000 megacycles is proving of considerable interest to systems designers.

Positions for engineers and physicists are available in the Research and Development Laboratories. If you would like to learn more about these positions, and are not now engaged in an urgent military project, write to:

Hughes Research and Development Laboratories
Engineering Personnel Department
Los Angeles County
Culver City, California

In spite of our rather underrated talents the Civil Engineer has come far since his beginning, which incidentally dates back to the beginning of time. Our society, the oldest professional engineering society in the United States, is celebrating its centennial anniversary this year. There are 73 local sections located throughout the United States, Hawaii, Panama Canal Zone, and Puerto Rico. Membership in these local sections is almost 35,000, and students chapters have been established in 133 engineering colleges. George Washington University is and should be proud of their chapter as it is an outstanding one. This chapter has three times submitted prize winning annual reports and last year they played host to the Annual Spring Conference which includes Johns Hopkins, Maryland, Catholic, and Howard Universities. Membership to this society is open to candidates for the B.C.E. and B.S. in E. degrees.

Our chapter here at G.W.U. has been and we hope will remain a very active chapter. It offers a variety of activities; namely social, business, technical and participation in the activities sponsored by the Engineers' Council. The social activities consist of two stag parties and a picnic. These affairs give the student and the C.E. faculty a chance to mingle in an off the cuff manner. A football game is also played at the picnic in which the faculty participates. Needless to say any more. Business activities are limited to financing the chapter, membership, correspondence, parliamentary procedure. A formal meeting is held the first Wednesday of each month in which business is transacted and prominent members of the civil engineering profession are invited to discuss new developments in engineering or interesting features of their specialized field. Movies of C.E. interest are also shown at intervals. Students papers are given at the final meeting of each year and prizes are awarded for the best graduate and undergraduate papers. Field trips to local construction projects, laboratories, and offices are also arranged.

Here is this year's schedule to date:

- 1 Oct. 1952—Engineers' Mixer, Highland Apts., Conn. Ave. & Calif. St., N. W.
- 5 Nov.—Waldo Smith, President of Washington, D. C. Section, A.S.C.E.
- 3 Dec.—Douglas Gillette, noted Army engineer, on White House reconstruction.
- 7 Jan. 1953—Moses Freedman, construction engineer, G.W. alumnus.
- 4 Feb.—Movie "The Open Road," construction of modern highway.
- 4 Mar.—Gail A. Hathaway, past national president of the A.S.C.E.
- 1 Apr.—Movie "Bridging San Francisco Bay," construction of 8-mile bridge.
- 6 May—Presentation of students papers and elections of officers.



● The George Washington Student Branch of the American Society of Mechanical Engineers is composed of students in the School of Engineering who are studying for the degree of Bachelor of Mechanical Engineering.

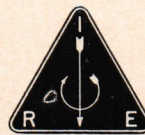
On the first Wednesday of each school month, the ASME has a combined social and technical meeting. Speakers from the Washington Area and sometimes representatives from companies in the east are invited to give talks on various aspects of engineering. Movies are often included in the

program. Refreshments are usually served after the meetings, thus giving members a chance to get better acquainted with their fellow students and their professors. The Student Branch also arranges inspection trips to places of interest to the student engineer such as the Naval Gun Factory, the Naval Ordnance Laboratory, the Bureau of Standards, and generation stations of the Potomac Electric Power Company. These trips are free and are scheduled for the benefit of the student.

In addition to the student officers of the branch, an Honorary Chairman is selected each year from the faculty of the Mechanical Engineering Department to aid the student officers in the administration of the affairs of the group. The Honorary Chairman for this year is Professor John Kaye.

The ASME elects two members to the Engineers' Council each year, and since the Engineers' Council has a member on the Student Council, the ASME has a voice in the affairs of both the School of Engineering and the University.

The Washington Section of the ASME is the sponsor of the GW student branch and has opened its meetings to student members. Students are also invited to attend the various inspection trips arranged by the parent group. The national organization makes an annual monetary contribution to the student branch dependent upon the number of members and also provides the student member with eight issues of their publication "Mechanical Engineering." In addition to the above, the national group offers awards for various student papers submitted to them. Student members are also invited to attend the national conferences and the regional student conference held annually in this area.



● The George Washington University Student Branch of the Institute of Radio Engineers is open to students in electrical engineering who are taking the communications option, or to those who are primarily interested in electronics. The Branch was formed to bring together people interested in

electronics and associated fields to supplement the courses of instruction and to correlate the information presented in class. At the regular meetings lectures are given by men of prominence, usually from the various government laboratories in the Washington area. Most of the speakers are experts in their field and prove to be extremely interesting. The George Washington University Branch is most fortunate in having such a large group of specialists available to speak on an almost unlimited range of subjects.

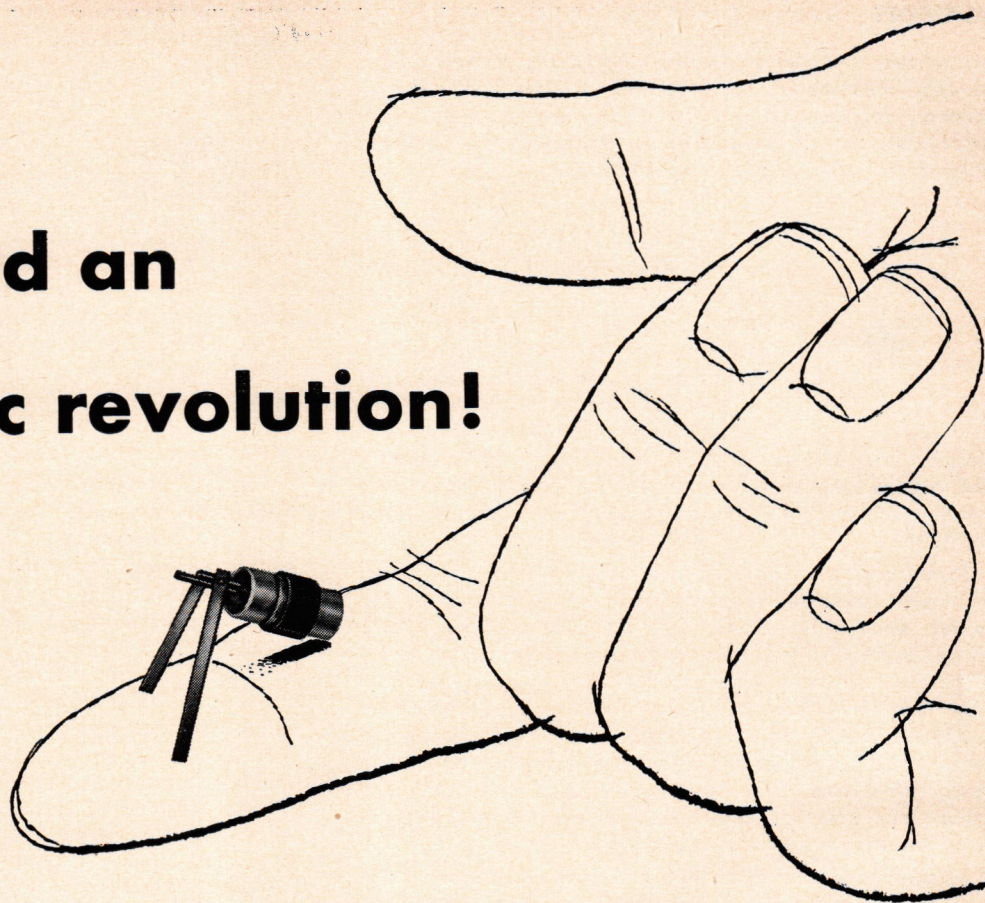
The topics for the lectures are chosen so that they will be broad and general enough to interest everyone from seniors to freshmen and at the same time to be technically interesting. After each lecture there is a question and answer period while refreshments are served and enjoyed. During the year field trips are planned to nearby laboratories and factories to cover a phase of training that cannot be covered in the classroom.

The other activities are more social and include the annual softball game with the A.I.E.E. every spring. This has proven to be very popular because it adds to the friendly rivalry between the two groups and offers a chance for friends and families to get together.

Membership in the branch is beneficial because it brings together students for a common purpose and offers a basis for friendships that might not otherwise be made, and also aids the student in meeting and becoming better

Please turn to page 20

It sparked an electronic revolution!



The 2A Transistor illustrated is designed to fit a plug-in socket. In one use in the Bell System, ribbon leads are employed as shown above.

Perhaps you've heard something about the transistor—a tiny and mechanically simple electronic device based on an entirely new principle. It can do many things a vacuum tube can do—yet its greatest possibilities may lie in applications where vacuum tubes have *not* been used.

A few years ago this revolutionary device was invented and experimentally made by scientists at Bell Telephone Laboratories. Today, several types of transistors are in production at Western Electric—manufacturing unit of the Bell System.

This didn't just happen! Its manufacture is the result of a lot of teamwork by Western Electric engineers of varied skills and training.

Transistors are unimpressive looking little things, but don't let that fool you! The most delicate metallurgical and manufacturing skills

are required in their production. In one type of transistor there are three thin adjacent regions of germanium, each region containing chemical elements in exact quantities, the whole unit being no larger than the head of a match! Suitable leads, or wires, must be positioned in proper relation to these layers with utmost accuracy, using microscopes and oscilloscopes.

Transistors can do many things: transform radio energy for driving a telephone receiver or loudspeaker—amplify weak signals—generate a-c current—convert a-c to d-c—respond to light—increase, decrease or halt the flow of current. Small and rugged, they're going to work today in the Bell System and in varied types of military equipment.

Quantity producing these mighty mites—with laboratory precision—is typical of many forward-looking engineering projects at Western Electric.

Western Electric



A UNIT OF THE BELL SYSTEM SINCE 1882

acquainted with the professors. By taking an active part in this organization and working on the various committees, you become a part of the Engineering School activities. Every organization welcomes more members willing and able to take responsibility.



- Sigma Tau, GW's honorary engineering fraternity, was founded in Lincoln, Nebraska on February 22, 1904. In its 48 years of existence it has attained nationwide recognition and prominence. Early in 1930, Sigma Tau accepted an invitation to join the Association of College Honor Societies.

Xi Chapter, one of 28 chapters on university and college campuses throughout the United States, was established at George Washington University on April 18, 1921.

Membership to Sigma Tau is selected from those men who rank in scholarship among the upper third of the junior and senior classes of the Engineering School. However, this is but one of the requirements for membership. Those who have attained the necessary scholarship must have demonstrated a willingness to participate in the University functions, such as actively joining the engineering societies and attending university-sponsored group activities. The prospective member must also exhibit the practical qualities that are necessary attributes to every successful engineer.

As part of the program of the Annual Engineers' Banquet sponsored by the Engineers' Council, of which the fraternity is an active member, Sigma Tau bestows a medal of achievement upon the engineering student, usually a sophomore, who has attained the highest grades in his engineering courses during his freshman year. In addition, Sigma Tau offers a sizable fellowship annually to some deserving member of the fraternity upon his graduation from the engineering school.

As a member of the Engineers' Council, Sigma Tau takes an active interest in its efforts to constantly increase the prestige and potential of the Engineering School. Plans are in effect toward the initiation of a program for building visual aides as a means of explaining the more complex phases of engineering education. Because George Washington University includes many foreign-born among its student body, Sigma Tau is participating in a program designed to help these men overcome the language barrier.

After Xi Chapter, what then? The Washington Alumni Association of Sigma Tau is composed of engineers now working in the Washington Area. At this writing, the organization is just beginning to grow but counts among its members prominent executives in all phases of the engineering profession. The friendships resulting from these fraternal ties have proved to be among the most potent influences in the attainment of success.

Membership in Sigma Tau is an honor for which every engineering student should strive. Not only will it stimulate him to greater scholastic achievement, but it will also promote development of leadership, which carries with it the principle of service, and the measure of service is the true index of worth of the student and the organization that counts him as a member.

Herb Rosen, the dynamic president of Sigma Tau flew out to Laramie, Wyoming to attend the National Conclave for 1952. While there he attended a barbecue in the mountains, the usual banquet, and a football game between

the U. of Wyoming and Colorado A & M. The Conclave was held October 9, 10 and 11.



- Theta Tau fraternity was founded at the University of Minnesota in 1904. The founders felt that some means of developing high standards of professional interest among student engineers was needed, and that an organization which could accomplish this and also unite students in the

various fields of engineering with strong bonds of fraternal friendship would be of immense value to both the students and to the engineering profession. The wisdom of these men has become increasingly apparent by the continual growth of the fraternity until it is now the largest engineering fraternity in the country.

As a professional fraternity, Theta Tau does not compete with the social fraternities, nor are the membership requirements such that it competes with or serves as an academic honor society. Here at George Washington University one of the prime functions of Gamma Beta Chapter and also an excellent recommendation for membership is an active interest in the extra-curricular activities of the School of Engineering. The social activities of the chapter now include various events, an annual football game and shrimp feast, several informal parties both stag and drag, and the highlight of each semester, the initiation banquet and dance. These have proved to be the Chapter's best answer to the establishment of a common bond between the various options represented in our membership. Each year the fraternity presents an award to that graduating senior who has, in the opinion of the faculty, contributed the most to the extra-curricular activities of the School of Engineering and to the University as a whole.

Membership is by invitation only. Members are chosen from among those outstanding students who have successfully completed at least their freshman year in the School of Engineering and who have shown an interest in the fraternity and its ideals. Several rush parties are held each year to give both the prospective and active members an opportunity to become better acquainted with each other.

Students desiring further information may contact one of the chapter officers or members.

Engineers' Council

- According to the constitution of the Council, "The general purpose of the Council shall be to provide liaison between the student body of the School of Engineering of the George Washington University, and the faculty, administration and student government of the University, in all matters

affecting the general interests and welfare of the student body, the School of Engineering, or the University." The constitution further states that the Council shall sponsor the Annual Engineers' Ball, the Annual Engineers' Banquet, joint society meetings, mixer meetings, and other cooperative affairs.

As a general rule, no other type of organization is as indefinite in purpose and action as a "coordinating body". However, the Ball, the Banquet, the more and more popular mixers, and a very broad interpretation of the word coordinating have made a useful and vital organization of the Engineers' Council.

The Council is made up of two representatives from each of the member organizations, and the Business Mana-

Please turn to page 24

ME...

an AIRCRAFT engineer?

But I haven't majored in
aeronautical engineering

That doesn't matter.
Lockheed can train you...
at full pay!



It's your aptitude, your knowledge of engineering principles,
your degree in engineering that count.

Those—plus the opportunity Lockheed is offering you—are all you need for a
career as an aircraft engineer. In Lockheed's special program for engineering
graduates, you may go back to school, or you may convert to aircraft work by
doing—on-the-job training. But whichever it is, you receive full pay while learning.

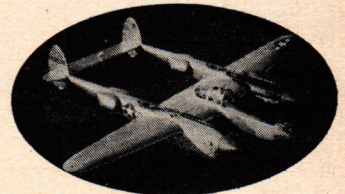
But Lockheed offers you more than a career. It offers you a new life, in an area
where living conditions are beyond compare. Outdoor living prevails the
year-'round. Mountains, beaches are an hour from Lockheed.

See your Placement Officer today for the details on Lockheed's Aircraft Training Program
for engineers, as well as the better living conditions in Southern California.

If your Placement Officer is out of the illustrated brochures describing living and
working conditions at Lockheed, write M. V. Mattson, Employment Manager

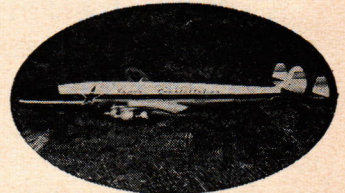
Lockheed Aircraft Corporation
Burbank, California

This Plane made History



The P-38 Lightning—first 400 mile
per hour fighter-interceptor, the
"fork-tailed Devil" that helped
win World War II.

This Plane is making History



The Super Constellation—larger, faster,
more powerful; the plane that bridges
the gap between modern air transport
and commercial jet transport.

This Plane will make History

The jet of
the future—the plane
you will help create—
belongs here.

This plane—which exists only in
the brain of an engineer like yourself
—is one reason there's a better
future for you at Lockheed. For
Lockheed will always need engineers
with ideas, engineers with
imagination, engineers who build
the planes that make history.

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The Engineers' Council

| | |
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| President | H. Kriemelmeyer |
| Vice President | James Colangelo |
| Treasurer | Lynn Garrison |
| Secretary | Paul Michelsen |

Sigma Tau Fraternity

| | |
|----------------|----------------------|
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| Vice-President | Paul Michelsen |
| Secretary | L. E. Goodnight, Jr. |
| Treasurer | Joe March |

Theta Tau Fraternity

| | |
|-------------|-----------------|
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| Vice Regent | Dan Andrich |
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| Treasurer | Tom Flanagan |

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Institute of Radio Engineers

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American Society of Mechanical Engineers

| | |
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| Vice President | Virgil Pence |
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| Secretary | Harold Boyd |

ALUMNEWS

Herman Norwood BEE '52 can't get out of the saddle. Feeling lonesome after graduation he missed spending part of his day without a professor standing in front of him. So—he enrolled in Dale Carnegie's Leadership Training Course. He recommends it very highly. Herm, incidently, is still with the Library of Congress Recording Lab.

John Held BEE '52 enjoyed a short period of freedom too. His step, however, was more permanent. Scuttlebutt has it that he married Pat Jennings around October 5th. Latest reports place him in Williamsburg—honey-mooning no doubt.

Dan McBride, BME '47 has his own engineering firm out in Silver Spring, Maryland. This growing concern is known as the TriPac Engineering

Please turn to page 30

FACULTY DIRECTORY

| | | |
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| Dean: Martin Alexander Mason | N-10 | Ex. 246 |
| Secretary: Mrs. Anne Chason | N-10 | Ex. 246 |

Civil Engineering

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| Harren Albert Miklofsky, Ex. Off. | N-202 | Ex. 258 |
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| Bruce Douglas Greenshields | N-30 | Ex. 256 |
| Raymond Pugh Eyman | M-30 | |

Part Time

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| Ralph E. Fuhrman | M-20 | Ex. 381 |
| James E. Robins | M-20 | Ex. 381 |
| William J. Ruby | M-20 | Ex. 381 |
| Alvin R. Schwab | M-20 | Ex. 381 |
| E. Wallace Teagarden | | |

Electrical Engineering

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| Norman Bruce Ames, Ex. Off. | ME Annex | Ex. 251 |
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Part Time

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| Forest K. Harris | P | M-20 | Ex. 381 |
| George Abraham | C | M-20 | Ex. 381 |
| William W. Balwanz | C | M-20 | Ex. 381 |
| Ralph A. Brady | P | M-20 | Ex. 381 |
| Cladius E. Bennett | P | M-20 | Ex. 381 |
| William H. Fiden | C | M-20 | Ex. 381 |
| William H. Gossard | C | M-20 | Ex. 381 |
| Herbert Kanner | C | Bldg. V | Ex. 480 |
| Kermit M. Lovewell | P | M-20 | Ex. 381 |
| Jerome A. Lee | P | M-20 | Ex. 381 |
| Malcolm R. Moore | P | M-20 | Ex. 381 |
| Harold Valdemar Oerting | P | M-20 | Ex. 381 |
| George Pida | P | M-20 | Ex. 381 |
| Dwight Edward Shytley | P | M-20 | Ex. 381 |
| Benjamin F. Slingluff | P | M-20 | Ex. 381 |

Mechanical Engineering

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| Robert Gay Trumbull | ME Annex | 250 |
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| John Kaye | ME Annex | 248 |

Part Time

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| David W. Baker | M-20 | Ex. 381 |
| Bernard Bernstein | M-20 | Ex. 381 |
| Roy V. Colbert | M-20 | Ex. 381 |
| Edward F. Davis | M-20 | Ex. 381 |
| Richard L. Fenton | M-20 | Ex. 381 |
| John C. Goff | M-20 | Ex. 381 |
| Malcolm W. Callahan | M-20 | Ex. 381 |
| Arnold Mayo Kronstadt | M-20 | Ex. 381 |
| Eli Baer Roth | M-20 | Ex. 381 |

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G. W. DELICATESSEN

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Biggest Sandwich In Town

THE MECHELECIV

New RCA Victor record changer

— easiest to play at all three speeds!

THE CENTER IS THE SECRET:

Just slip on the large center spindle to play "45" records *automatically*. Slip it off, and play records at other speeds.

Permanent spindle and changer play stacks of 33 $\frac{1}{3}$ or 78 rpm records *automatically*.

A flick of the finger and you have the right needle to play 45, 33 $\frac{1}{3}$, or 78 rpm records.

Fingertip control of speeds (78, 33 $\frac{1}{3}$, 45) and one control for *On, Off, or Reject*.

World's simplest 3-speed changer, this versatile Victrola combines new playing ease with the finest reproduction of sound. And it changes "45" rpm records *correctly*, on the same turntable used for other speeds.

Key to this advance is RCA Victor's *slip-on* "45" spindle, which fits over the permanent spindle and locks in place. No plugs or extra gadgets. Simply stack your "45" records on this fine instrument, and play up to fourteen of them—at the twist of a knob. Then, whenever you wish, remove the "45" spindle, flick the

needle and speed controls, and the same Victrola changer will play records *automatically* at 33 $\frac{1}{3}$ or 78 rpm.

More than a year of research and engineering went into this changer—further evidence of the leadership which assures you finer performance in any product or service of RCA and RCA Victor.

* * *

See the latest in radio, television, electronics at RCA Exhibition Hall, 36 West 49th St., N. Y. Admission is free. Radio Corporation of America, RCA Building, Radio City, New York 20, N. Y. Tmks. ©

CONTINUE YOUR EDUCATION WITH PAY—AT RCA

Graduate Electrical Engineers: RCA Victor—one of the world's foremost manufacturers of radio and electronic products—offers you opportunity to gain valuable, well-rounded training and experience at a good salary with opportunities for advancement. Here are only five of the many projects which offer unusual promise:

- Development and design of radio receivers (including broadcast, short-wave and FM circuits, television, and phonograph combinations).
- Advanced development and design of AM and FM broadcast transmitters, R-F induction heating, mobile communications equipment, relay systems.
- Design of component parts such as coils, loudspeakers, capacitors.
- Development and design of new recording and producing methods.
- Design of receiving, power, cathode ray, gas and photo tubes.

Write today to College Relations Division, RCA Victor, Camden, New Jersey. Also many opportunities for Mechanical and Chemical Engineers and Physicists.



RADIO CORPORATION OF AMERICA

World leader in radio—first in television

SOCIETIES (Continued from page 20)

ger of the Mecheleciv magazine. Officers of the Council are elected at the first meeting by vote of the newly elected representatives. At the present time there are six organizations which are members of the Council: The American Institute of Electrical Engineers, The American Society of Civil Engineers, The American Society of Mechanical Engineers, The Institute of Radio Engineers, Sigma Tau, and Theta Tau.

The Council meets once a month, usually the last Wednesday at 8:15 P.M. in the second floor conference room of Bldg. M. The dates of the meetings are announced in advance in the Hatchet and in the Mecheleciv. All members of the School of Engineering are welcome, and interested students are urged to attend and express their views. Voting and all parliamentary rights are reserved to Council members, but others wishing to address the Council will be given an opportunity to do so.

Each year the Council sets up a program of events and attempts to fulfill its duty of "coordinating", and also endeavors to accomplish some worthwhile projects for the betterment of the School of Engineering. This year the Council proposes to:

- (a) Sponsor a successful "Mecheleciv", both from a financial and editorial standpoint;
- (b) Sponsor the best Engineers' Ball, Banquet, and Mixer that the University has ever had;
- (c) Improve engineering alumni relations by having an alumni open house program;
- (d) Strive to obtain an engineering clubhouse for student use;

- (e) Assist the University in furthering the position of the School of Engineering;
- (f) Promote a feeling of unity and fellowship among students of the School of Engineering.



Al Petrini

Engineers, Faculty and Alums Mix

● Undergraduates of the School of Engineering at the George Washington University have published their own magazine for ten years, and it is being continued here at the University at the present time. In its original form, each issue was three or four mimeographed sheets, giving the latest news of the engineering societies and fraternities, and student and faculty happenings. During

Please turn to page 26



● LEROY* Lettering equipment is standard in drafting rooms everywhere. No special skill is needed for perfect, regular lettering and symbol drawing. There are LEROY templates in a variety of alphabets and sizes, as well as for electrical, welding, map, geological, mathematical and other symbols that the draftsman needs. *Trade Mark®

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Surveying Equipment
and Materials,
Slide Rules,
Measuring Tapes.

INCREMENTS . . .

● The word "Highway" comes from England where kings built roads along the paths the animals had worn in following the high ground. Thus, the words "heigh-rode" and "heigh-way" become "highway" meaning public thoroughfare.

Armco Highway Magazine

● Soil stabilization by vegetable stabilizers has been tested in England with what promises to be successful results. Waste residue from sisal leaves is the material tested most extensively.

Armco Highway Magazine

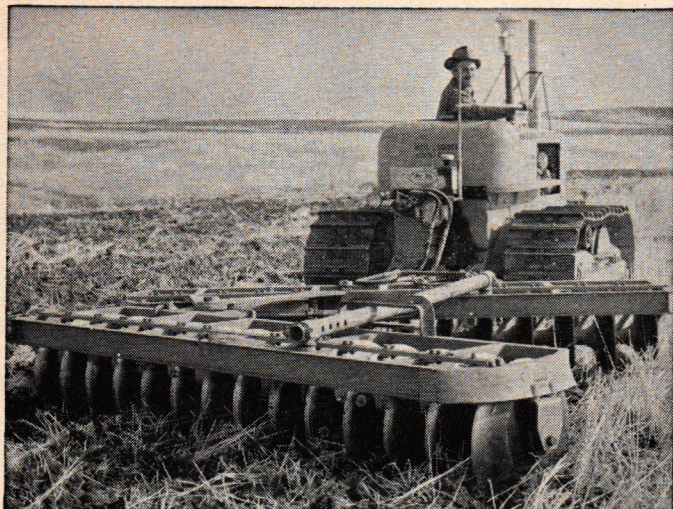
● YOUR CHOICE—"The vice of capitalism is that it represents the unequal share of blessings; whereas the virtue of socialism is that it stands for the equal distribution of misery."

Winston Churchill

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DRAFTSMEN'S & ENGINEERS'
SUPPLIES
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Another page for

YOUR BEARING NOTEBOOK

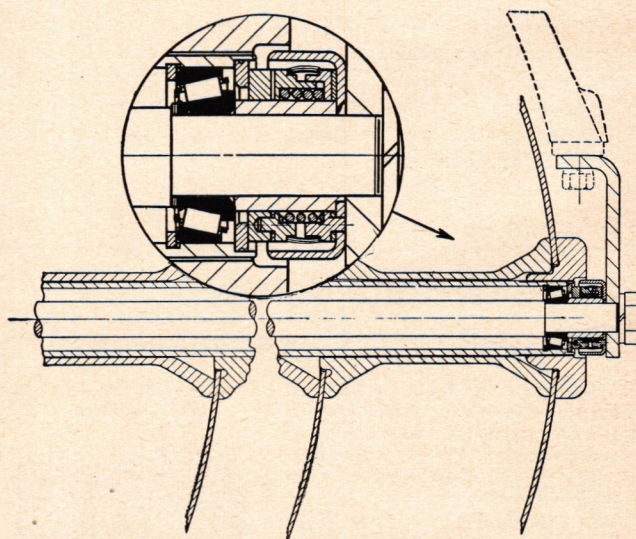


How agricultural engineers solve 3 design problems at once

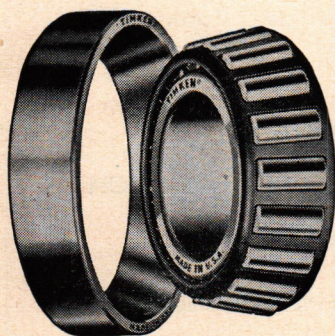
Designing farm machinery applications like the through shafts of disk harrows presents three big problems to agricultural engineers: 1) combination loads, 2) dirt, 3) ease of operation. Engineers solve all three problems at once by designing the shafts on Timken® tapered roller bearings. Because they are tapered, Timken bearings carry both radial and thrust loads in any combination. They keep housings and shafts concentric, making closures more effective. Dirt stays out—lubricant in. And they keep shafts turning easily because of their true rolling motion and incredibly smooth surface finish.

How to mount disk harrow shafts on TIMKEN® bearings

Two single-row Type TS Timken bearings are indirectly mounted on a stationary shaft in a rotating disk assembly. The bearing cups are press-fitted against snap rings. The bearings are adjusted by means of shims between the bearing cone and shaft shoulder. A special spring-backed rubbing seal assures maximum protection to the bearings. The rubbing seal itself is protected by a shield fitted about the closure assembly.



How to learn more about bearings



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Some of the engineering problems you'll face after graduation will involve bearing applications. If you'd like to learn more about this phase of engineering, we'll be glad to help. For a copy of the 270-page General Information Manual on Timken bearings, write today to The Timken Roller Bearing Company, Canton 6, Ohio. And don't forget to clip this page for future reference.

NOT JUST A BALL ○ NOT JUST A ROLLER ▭ THE TIMKEN TAPERED ROLLER BEARING TAKES RADIAL ⊙ AND THRUST ⊖ LOADS OR ANY COMBINATION ⊙

SOCIETIES (Continued from page 24)

its ten years on campus, it has developed into a regular magazine, of about 30 pages, published six times a year and running over 2,000 copies per issue. It now includes campus news, news of alumni, a calendar of events for each month in the Engineering School, special notices, news of the societies and fraternities, and articles on special points in the engineering field by students and faculty members.

Mecheleciv is published under the direction of the Engineers' Council, and each year the Council appoints a Board of Editors, who actually operate the machinery. The Board of Editors includes an Editor in Chief, Associate Editor(s), and a Business Manager. Working with these men are a group of about ten students, all volunteers. Some are writing, some sell advertising, some handle circulation. Frequently new students join the staff as freshmen, with no technical knowledge of engineering at all, since most of the job does not require previous experience or special ability.

The magazine is free to students. No funds are obtained from the University—Mecheleciv is supported by the Engineers' Council, the Alumni, and advertising sales. Finances and general policy are decided by the Board of Editors with the help of the Faculty Advisor, Professor Norman B. Ames.

For the school year 1952-53, all interested students are requested to leave their names, addresses, and telephone numbers at the office of the Dean, School of Engineering. If you desire to apply for a particular position please include this information. Anyone registered for 6 or more hours is eligible to serve.

Students desiring to submit material for the magazine may do so by dropping it in the Mecheleciv mail box on the first floor of the Student Union Annex, or mail it in to "Mecheleciv Magazine", Student Union Annex, George Washington University, Washington 6, D. C. The editors will read over all material submitted, and select several items for each issue.



Al Petrini

Prof. Cruickshanks learns a trick or two from Jim Spears at the Engineers Mixer while Prof. Brady looks on.

**DON'T FORGET. YOUR SERVICES ARE WELCOME EVERY SATURDAY
AT THE ENGINEER'S CLUB**

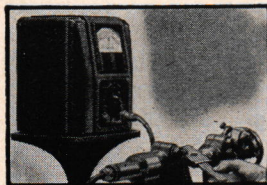
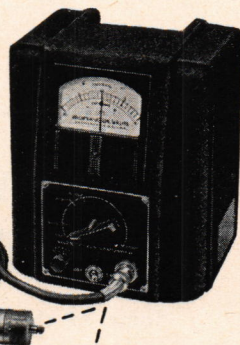
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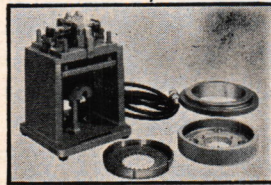
You can design inexpensive Gage Head Cartridges into several fixtures and use the same amplifier for all of them.

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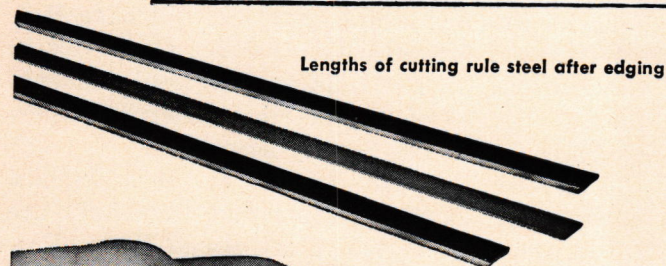
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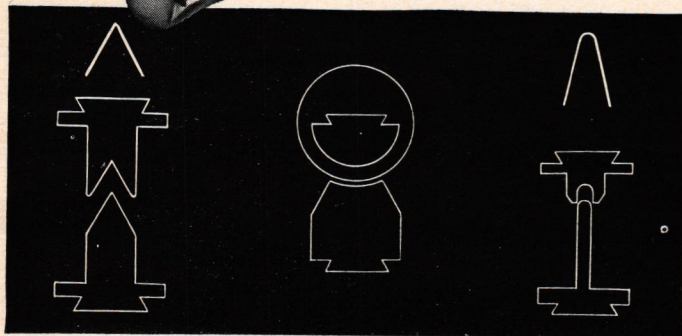
about scoring and cutting rule steel



Lengths of cutting rule steel after edging



Shaped to cut wallet section (note bends, and form-holding method)



Some examples of the many shapes of bends needed

Scoring and cutting rule steel is a cold-rolled specialty steel for use in preparing dies for cutting paper, leather, rubber and other materials.

It is a pre-tempered product manufactured by skilled workmen, using precision rolling and hardening equipment, to close limits for chemistry, grain size and hardness. This product must also be capable of meeting intricate bend requirements in the hardened and tempered condition.

This specialty is furnished with round edges and in coil form to the rule manufacturer who grinds the edges — the one edge square and the other to a knife edge as well as cutting the material into desired lengths. This is sold to a die-maker who bends the rule to the required shape. This is then the nucleus of a pre-hardened die, which when properly brazed and supported is used to cut out material for display cards — aircraft parts — pocketbooks — wallets — gloves — gaskets — washers.

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OCTOBER 1952



GWU Pub. Relations

↑
ASME RECEIVES CHARTER

On March 13, 1952, The George Washington Student Branch of the American Society of Mechanical Engineers was presented with a charter by the Washington section of the A.S.M.E. at its meeting in the PEPCO auditorium.

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Robert L. Anderson, Chairman of the George Washington University received the charter from Ernest H. Hanhart, Vice-President of Region 3 of the A.S.M.E. The GWU chapter was established May 27, 1924.

ENGINEERING SCHOOL HONORED

The first school to be honored in the series of social dances sponsored by the Student Council and the Dance Production Groups will be the Engineers. The dance, October 31, First floor, Student Union Building, 8:30-11, will have Halloween as its theme which will be carried out in the decor by the Art Club working with students from the School of Engineering, under the supervision of Mr. Kline, faculty advisor.

Everyone is invited to stop by, meet friends, and dance. Claudia Chapline and Steve Luke are the Student Assistants of the Social Dance Program. Working with them on the opening dance are Arthur Proctor, Representative of School of Engineering on the Student Council, and Harry Kriemelmeyer, President of the Engineer's Council.

The Engineers plan to provide entertainment; those wishing to participate or offer suggestions on any aspects of the Halloween dance contact Arthur Proctor.

Since the Engineers are being spotlighted, it is important that they are well represented by both students and faculty.

NEW SENSITIVE FILM

Eastman Kodak has announced the development of a new infrared sensitive motion picture film which permits motion pictures to be made in the dark with infrared illumination, or in the semi-dark without it.

The new film can be used in any 16 or 35 mm. motion picture camera excepting roll film or 16 mm. magazines. It will not however, be available in 35 mm. cassette loadings for 35 mm. still cameras. It was originally intended for use by spectrographic laboratories. It is now, however, being used for many other purposes such as audience reaction and ultra high-speed camera photography where its sensitivity to the infrared range of the spectrum makes it particularly valuable for recording—with supplemental—the flow and action of molten or hot metals.

Development results in a photographic negative which must be printed on another piece of film to produce a positive print for projection purposes.

CHERRY TREE days are coming. All engineers who expect to graduate this year are urged to get their pictures taken for the Engineer's section which is expected to be bigger and better this year. Cooperation is also sought in a large percentage subscription from the engineering student body.

Make the First Job Count!

by PAUL CLARK

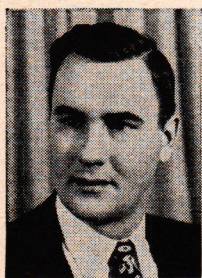
Application Engineer, Electric Control Section

WEST ALLIS WORKS

(Graduate Training Course 1950)

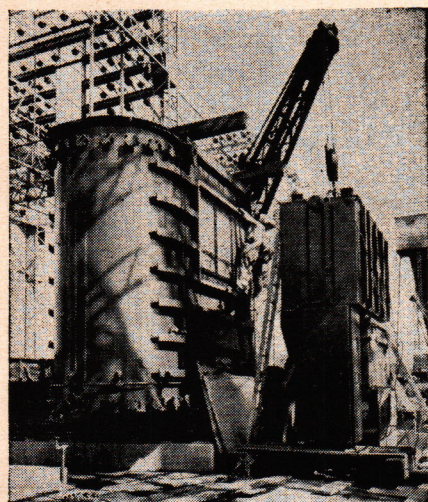
Iowa State—EE—1949

IT SUDDENLY occurred to me while I was a senior, looking for a job, that my first job would be all important. In a way, it was going to be almost as much a part of my schooling as my last year at "State."



PAUL CLARK

Since then, I've been glad I thought of it that way, because that's what the first year and a half was . . . schooling. Among other things, I learned what I wanted to do, and learned a lot about products and industry problems. But I give much of the credit for the great amount I learned to the Allis-Chalmers Graduate Training Course and consider myself very lucky to have chosen Allis-

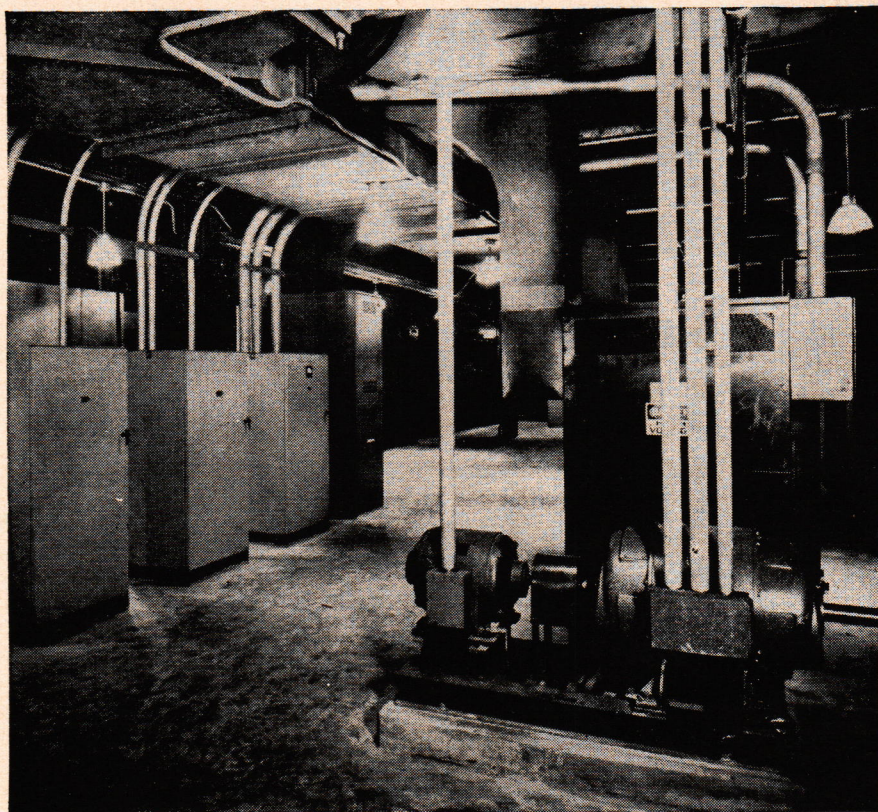


Power Transformer being installed in Midwest utility.

Chalmers. Perhaps a quick review of my own experience will show why I feel that way.

After graduating from Iowa State in 1949

I started the Allis-Chalmers Graduate Training Course on the Steam Turbine erection floor. From there I went to the switchgear and pump departments to familiarize myself with other utility equipment; and from there, to the Motor and Generator section, which at the time was my goal.



Brain of a giant 107,000-kw steam turbo-generator is this complex Regulex voltage control. Clark finds such control a fascinating problem.

Arrange Your Own Course

From this, you begin to see the freedom a GTC student has at Allis-Chalmers. You not only have complete freedom in arranging your course, but you can change your course as you go along and your interests develop. Best of all, you have a wide choice, because Allis-Chalmers builds such a wide line of products.

Even after getting to the Motor and Generator section, which had been my original goal, I had a chance to change my mind. While I found a certain glamour to the big motors and generators, I became really intrigued by the electrical brains of these giants, and decided to go to the control section to learn more about them. I have been working there ever since.

Today, I am in charge of pricing, applying and promoting the sale of three lines of control devices: *Rocking Contact* voltage regulators; *Regulex* voltage regulators; and liquid rheostats. Part of my time is spent traveling . . . visiting customers and helping district office salesmen.

Rocking Contact and *Regulex* are Allis-Chalmers trademarks

ALLIS-CHALMERS

For information call the Allis-Chalmers District Office in your locality or write to Allis-Chalmers Manufacturing Company, Milwaukee 1, Wisconsin



The time spent in other departments has paid off too. It not only helped me find the work I liked best, but I met people in departments all over the plant that I now work with in coordinating jobs for utilities. Even time on the Steam Turbine erection floor proved valuable, because it helps me in talking shop to utility men.

Wide Choice at A-C

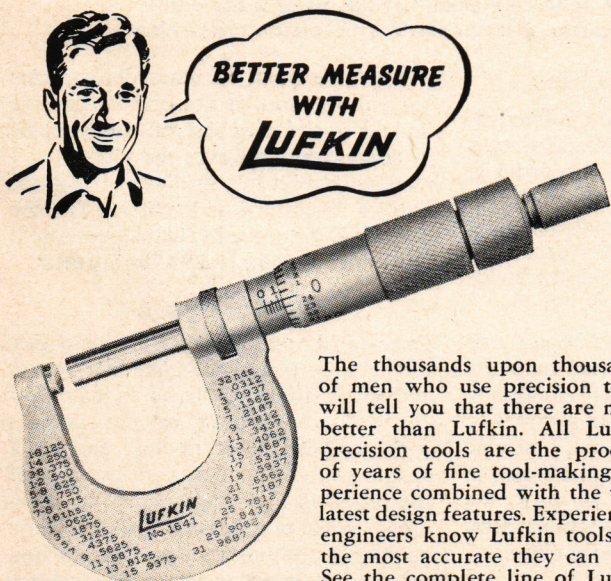
One reason you have such a wide choice is the fact that Allis-Chalmers makes equipment for every basic industry, including electric power, cement, mining, rock products, flour milling, and steel. Just to give you an idea, here are some of the products you might some day re-design, build or sell: transformers, steam condensers, pumps, motors, blowers, unit substations, steam and hydraulic turbines and generators, crushers, kilns, grinders, coolers, rolling mills, sifters, and many others.

That diversity can mean a lot to you in helping you find the job you want. It certainly helped me make my first job count.

Coporation and is located at 928 Philadelphia Ave. Dan started to form this company shortly after he graduated from George Washington. He did a little manufacturing at first, then worked up to job machinework and finally, this year established the company as an engineering concern. Among his many contracts he has several with the Bureau of Ordnance of the Navy for tool design and evaluation of equipment.

NECROLOGY . . .

Albert E. McPherson, a General Engineer in the Engineering Mechanics Section of the National Bureau of Standards died on September 6th. He had been with the Bureau since 1926 and had invented instruments to measure the properties of aircraft materials and had published many technical articles for NBS and The National Advisory Committee for Aeronautics. He was Secretary for the Local Chapter of the Society for Experimental Stress Analysis. When he wasn't engineering he was square dancing, his favorite hobby. Al McPherson received his BS in Mechanical Engineering from GW in 1933.



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to 18,000 lbs were developed and used by the Air Force in both the European and Pacific Theaters.

In 1943, Richard duPont dissolved his connections with All American to take over the post of coordinator of the Army Air Force glider program. In September, 1943, he was killed in the crash of an experimental glider.

Development continued in other fields. Target towing devices, in-flight refueling systems for fighters, experimental impellers, glider arresting gear and an air sea rescue winch were developed for the Navy and Army Air Forces. Experiments continued in the field of undrawn nylon to shock absorbing problems.

Expansion of airport facilities during the war resulted in the elimination of the justification for air mail pick-up service in the Middle Atlantic States, and in 1948, the air pick-up service was suspended. The military services are continuing the use of pick-up systems, however, and the use of UNOLYN is continued in safety harness, runway barriers, and aircraft arrestors. It should be noted that the elongation of UNOLYN is permanent; therefore each piece of rope or webbing can be used to make only one pick-up.

Editor

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ENGINEERS find good use for photography in virtually everything they do. All kinds of electrical and mechanical operations can be studied through photos of oscillograph traces. Fast-moving parts reveal their behavior in action when high speed movies stretch a second of motion into 3 or 4 minutes on the screen. Flaws in castings or welds show up in radiographs.

And so it goes. All through engineering, photog-

raphy has become a constructive and important tool. So important, as a matter of fact, that applying it in its many uses has become a specialty in itself. This has led graduates in the physical sciences and in engineering to find positions with the Eastman Kodak Company.

If you are interested, write to Business and Technical Personnel Department, Eastman Kodak Company, Rochester 4, N. Y.



This trace, photographed from a cathode-ray oscilloscope, depicts the detonation in a gasoline engine cylinder.

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"Can I be sure I'll be an individual at G.E.?"

... asks John Dillingham, Union College 1952

What's it like to work for a large company? In this and subsequent ads, the questions of college students on this subject will be answered by G-E men of varying degrees of experience. What's your question? Send it to College Editor, Dept. 221-6, General Electric Co., Schenectady 5, N. Y.

JOHN G. HUTTON, *General Engineering Laboratory* . . . It is largely the enterprise of the individual which makes him outstanding. In his own thinking he becomes a cog in a machine, not realizing that every such cog is a chosen piece, performing functions for what it is best characterized as a vital member of a team operation. So it is with the individual in General Electric. Just as in the community an individual is free to "be himself," but for his own and the community's sake he must be part of that community. General Electric's success lies in its unique ability to instill in its employees great team spirit yet at the same time to recognize the employee's inalienable right to be himself.

H. A. WINNE, *vice-president, Engineering Services* . . . An important point which many young people overlook is that, by and large, individuals work in groups of reasonable size in either large or small companies. In the large company these groups may be called units or sections, and a number of these may constitute a department; a number of departments may make up a division; and the company may comprise several divisions. In each component the "manager" has a comparatively small number of people reporting to him, and consequently any outstanding performer quickly comes to his attention.

Furthermore, in General Electric we have a number of courses which train for advancement and we are constantly combing the organization to recruit people for these courses, so by this separate means management keeps in touch with individuals.

On the basis of forty-two years' experience in the Company I can assure you it is difficult for the college

graduate to lose himself in the organization. There are too many people watching him, although he may not realize it for some time after entering the Company.

J. L. MICHAELSON, *manager, Employee Relations, General Engineering Laboratory*... The Company system for periodic employee evaluation furnishes a valuable guide to the individual with respect to his progress and ability. It also imposes on supervisory personnel the requirement that they study carefully the characteristics of all their employees. The system is so arranged that ability and good performance cannot remain unnoticed. Far from remaining obscure, each individual's characteristics are evaluated in order to provide him with the greatest opportunity to make use of his talents and abilities.

J. A. SPENCER, *manager, Employee Relations, Apparatus Sales* . . . The day I began work with G.E. twenty-odd years ago, and entered the plant with thousands of other Company employees, I felt small and insignificant and much inclined to climb on the first train returning to Montana. In a short time, however, I realized that I would be considered as an individual at General Electric.

I learned that the Company was operated in units of manageable size and that each person received individual consideration. My supervisors discussed my progress with me at regular intervals. I also learned that every employee's salary is reviewed individually at regular intervals.

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